When the flask was opened, the reaction of the fluid was found to be neutral.

Portions of the pellicle were at once transferred to a glass microscope slip, and then, protected by a covering glass, were submitted to a prolonged microscopical examination.* A number of little figure-of-eight particles, each half of which was $\frac{1}{20000}$" in diameter, were seen in active movement, even in situations where they could not have been influenced by currents. The portions of the pellicle were made up of large, irregular, and highly refractive protein-looking particles imbedded in a transparent jelly-like material. The particles were most varied in size and shape, being often variously branched and knobbed. There were also seen several very delicate, perfectly hyaline, vesicles about $\frac{1}{2000}$" in diameter, these being altogether free from solid contents.

A subsequent and most careful examination of a considerable quantity of the granular matter of the pellicle which had been mounted on two microscope-slips,† and at once protected by surrounding the covering glasses with cement, revealed five spherical or ovoid spores the average size of which was about $\frac{1}{3000}$" in diameter. They all possessed a more or less perfectly-formed

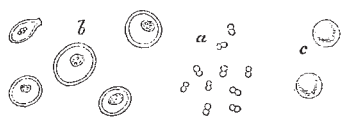

FIG. 18.—Fungus-spores found in a Carbonate of Ammonia and Phosphate of Soda Solution which had been exposed to a temperature varying from 146° to 153° C. for four hours.

nucleus, and all showed a most distinct doubly-contoured wall. One of the smaller of them showed that it had reached a stage where it was about to germinate. In addition, one small mass of *Sarcina* was seen, not very distinctly defined, owing to its being still in a somewhat embryonic stage.

H. CHARLTON BASTIAN

(*To be concluded.*)

NEW OBSERVATORY AT THE MAURITIUS

(*Communicated.*)

HIS Royal Highness the Duke of Edinburgh and his Excellency Sir Henry Barkly, attended by their respective suites, arrived at the site of the New Observatory at half past ten on Monday morning, May 30th, and were received by the President and Council of the Meteorological Society.

The architect of the building, Mr. Bowdler, of the Surveyor General's Department, and Mr. Horne, of the Royal Botanical Gardens, had elegantly decorated the grounds and the enclosed space around the massive stone.

The President, Captain Russell, R.N., read and presented the following address :—

"*To Captain His Royal Highness* ALFRED ERNEST ALBERT, *Duke of Edinburgh, Earl of Ulster, Earl of Kent, K.G., K.T., G.C.M.G., G.C.S.I., R.N., &c.*

"May it please your Royal Highness,

"We, the President and Council of the Meteorological Society of Mauritius, beg leave to approach your Royal Highness with the assurance of our loyalty to the Crown, and of our devoted attachment to Her Majesty the Queen and the Royal Family.

"We desire to offer to your Royal Highness a cordial welcome to these shores.

"Mauritius being admirably situated for meteorological and magnetical observation, it has long been the ardent wish of the Society that an Observatory, fully equipped with instruments of the most approved construction, should be permanently established for that purpose.

"Through the wise and liberal policy of the late Sir William Stevenson, and more immediately that of our present Governor and Patron, his Excellency Sir Henry Barkly, the moment for commencing the principal building has now arrived.

"We therefore hail with joy the auspicious occasion which allows us to request that your Royal Highness will be pleased to lay the Foundation Stone.

"Meteorological and magnetical researches, having for one of their main objects the safety and welfare of Navigation, touch closely the commercial prosperity of the world, and link together men of every nation by the cords of a common interest. Your Royal Highness, therefore, being not only an Officer in the Naval Service of a Queen whose ships traverse every sea, and whose Dominions extend to the remotest shores, but also the Son of an Illustrious Prince, who was ever foremost in encouraging Science, there could not, we venture to to think, be a more fitting Monument of the visit of your Royal Highness to Mauritius than a building to be specially devoted to objects with which your Royal Highness's experience cannot fail to prompt a generous sympathy.

"With our warmest wishes for your Royal Highness's welfare and happiness, and with renewed assurances of our devotion to our beloved Sovereign's Person and Family,—We have the honour to be, with the highest respect, your Royal Highness's most humble and most dutiful Servants,

"(Signed) James Tho. Russell, R.N., *President;* H. J. Jourdain, *Vice-President;* A. J. W. Arnott. *Treasurer;* J. C. Browne, C. Bruce, A. B. Commins, M. Connal, J. H. Finniss, Robt. Leech, George McIrvine, *Council;* C. Meldrum, *Secretary.*"

His Royal Highness replied in the following terms :—

"*To the President and Council of the Meteorological Society.*

"Gentlemen,

"I beg to thank you most heartily for your cordial welcome. It will afford me sincere pleasure to lay before Her Majesty the assurance of loyalty and devotion conveyed in your address.

"As an officer in the navy, I fully appreciate the advantageous position of this island for meteorological and magnetical observation, and it is with great satisfaction that I proceed to comply with your invitation of laying the foundation stone of a building to be specially devoted to objects of such importance.

"Your expressions of affectionate interest in all that concerns my future welfare and usefulness in the career which, by God's will, may be before me, are such as to demand a no less cordial response on my part.

"May this ceremony be auspicious to all concerned, and I sincerely trust that the Observatory, when completed, may realise all the expectations of its promoters, and continue throughout the future, not only a source of utility to the colony itself, but an aid to the cause of science, and a blessing to navigators throughout the world.

"(Signed) ALFRED."

The ceremony of laying the foundation stone was then proceeded with. His Royal Highness first deposited in a recess in the lower stone a bottle containing coins of the realm, a copy of the address, newspapers of the colony, and a paper on which was engrossed the following inscription :—

"This foundation stone of the Mauritius New Observatory was laid by Captain H.R.H. the Duke of Edinburgh, in presence of H. E. Sir Henry Barkly, K.C.B., F.R.S., Governor and Commander-in-Chief of Mauritius, at the request of the Meteorological Society, on Monday, the 30th of May, 1870."

His Royal Highness then spread the lower stone with mortar, and the upper stone was lowered into its bed. The Prince afterwards tried the stone with plumb-rule, level, and gavel in right masonic style, and declared it well and truly laid.

The trowel used by his Royal Highness, and presented to him by the society, was of solid silver, elegantly chased and of beautiful form. It was manufactured by Mr. G. Lewison, of Royal Street, and had engraved on it the following inscription :—

"Presented to His Royal Highness Alfred Ernest Albert, Duke of Edinburgh, K.G., K.T., G.C.S.I., R.N., by the Meteorological Society of Mauritius, at the laying of the Foundation Stone of a new Meteorological and Magnetical Observatory. Mauritius, 30th May, 1870."

The Secretary, Mr. Meldrum, then addressed his Royal Highness as follows :—

* Professor Huxley examined portions of the pellicle as soon as they were removed. He at once admitted the general resemblance as regards microscopical characters between this and the pellicle which forms on solutions containing organic matter. The particles were, however, mostly indefinite in shape rather than definite, though they were obviously imbedded in a clear jelly-like material. They became deeply tinted, also, when tested with a weak magenta solution, in the same way that the monads and bacteria of an ordinary pellicle are tinted by such a fluid, whilst the jelly-like material only assumed the faintest tinge of colour.

† These were the two specimens which were mounted in Prof. Huxley's presence, and which were examined by him. After he left I spent more than two hours in thoroughly searching over these specimens with a $\frac{1}{12}$" objective. And the result was that five fungus-spores were found in the two specimens as above stated. These are still in my possession.

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"May it please your Royal Highness.—On behalf of the Meteorological Society, and as Government Observer, I have the honour to thank your Royal Highness for having been graciously pleased to lay the Foundation Stone of the Mauritius New Observatory.

"I am sure I only give expression to the feelings with which the Society is animated, when I say that it will ever retain a most grateful sense of the generous sympathy and consideration which have induced your Royal Highness to come here, to-day, at personal inconvenience, to perform the interesting and important ceremony which the Society has had the extreme gratification to witness.

"If anything could enhance the pleasure which the Society now feels, it is the presence, on this auspicious occasion, of his Excellency, Sir Henry Barkly, who, during a long and an arduous administration, has not ceased to take a warm interest in the Society's objects, and to whom will be mainly due the merit of establishing in this distant Colony an Observatory which, I hope, will be second to none of the same nature in other portions of Her Majesty's dominions.

"Engaged for the most part in agricultural and commercial pursuits, but yet dependent for the necessaries of life on importations from other countries, and surrounded by a tempestuous ocean, the people of Mauritius, deeply interested in the progress of meteorological science, and many of them actively occupied in promoting it, will, I have no doubt, long preserve a fond recollection of the part which your Royal Highness has been kind enough to take in this day's proceedings.

"But the labours to be carried on here will be not merely of local utility. I trust they will also contribute to the advancement of meteorology and of terrestrial magnetism generally, as well as of certain branches of physical astronomy. In this respect their chief practical aim will be to render service to the noble profession of which your Royal Highness is so distinguished a member; and next to the pleasure of contemplating the works of the great Author of Nature, I know no stronger incentive to perseverance than the circumstance that the building about to be raised on this solitary spot, in the heart of the Indian Ocean, for the special object of conducting researches calculated to be of use to the maritime nations of the world, will in all future time be associated with the cherished name of England's sailor Prince."

His Excellency the Governor briefly addressed the audience. His Excellency said that he had always, as Mr. Meldrum remarked, taken much interest in the Society, and had done all in his power to promote its objects. It gave him great pleasure that the foundation stone of a new observatory had been laid before his departure from the colony. The ceremony could not have been more appropriately or more gracefully performed than by his Royal Highness, who was not only the second son of Her Majesty the Queen, but also a distinguished naval officer. His Excellency concluded amid general applause, by heartily wishing every possible success to what he would propose to call the Royal Alfred Observatory. Thus terminated these interesting proceedings.

SCIENTIFIC SERIALS

Journal of the Chemical Society, June, 1870.—Messrs. T. Bolas and C. E. Groves give a description of the mode of preparation and the properties of tetrabromide of carbon, the discovery of which they had announced in the preceding number of the Journal. Bisulphide of carbon was digested with an excess of bromine in the presence of terbromide of antimony or of bromide of iodine in a sealed tube of 150° for 48 hours. The bromide can also be obtained from bromopicrin and bromoform by treatment with the same reagents. Tetrabromide of carbon crystallises in white lustrous plates, fusible at 91°, nearly insoluble in water, soluble in alcohol, ether, benzol, and bisulphide of carbon, decomposed by aqueous solutions of potassa and soda at 150°. With care it may be sublimed without decomposition. By reduction by nascent hydrogen it produces bromoform and dibromide of methylene. The authors intend to study the action of argentic oxalate, cyanide, &c., on this interesting compound. Prof. A. H. Church continues his researches on new and rare Cornish minerals, giving the analysis of restormelite, which appears to be kaolinite $Al_2O_3\,2SiO_2$, 2Aq, in which some of the hydrogen is replaced by potassium and sodium and a portion of the aluminium by iron. The specific gravity is 2·58, and the hardness about 2. Chalcophillite contains 8 CuO, Al_2O_3, As_2O_5, 24 or 25 Aq., it loses 13·79 per cent. of water *in vacuo*, corresponding to 11 H_2O; the specific gravity is 2·44. This number also contains the commencement of a very long and elaborate paper on the combinations of carbonic anhydride with ammonia and water, by Dr. E. Divers. The author gives a history of the different compounds which he has examined, and describes no less than nine processes for the preparation of normal ammonium carbonate $CO_2\,(OH_2)_2\,(NH_3)_2$. Its properties and reactions are also fully given. In the second section, only a portion of which appears in this number, the preparations and properties of the half acid ammonium carbonate are detailed.

THE *Revue des Cours Scientifiques* for June 18, is almost entirely occupied with a translation of Prof. Huxley's address before the Geological Society on the course of palæontology during the last eight years. M. Bernard also proceeds with his course of lectures on suffocation by the fumes of charcoal, which is again continued in the following number, where we find also a paper read before the Congress of German Naturalists and Physicians at Innsbrück by Prof. Kékulé, on chemical work, and a review by Prof. Duclaux, of Pasteur's Researches on the Silkworm Disease. In the number for July 2, is a very important article by Prof. Agassiz on the Gulf Stream, being a report of the dredgings from the bottom of the Gulf Stream, made during the third expedition of the U.S. steamer *Bibb*. Prof. Agassiz believes that in the cretaceous period a current set in in the Atlantic from the north-east to the south-west, North and South America being then distinct continents, and that it was only at a subsequent period that communication between the Atlantic and Pacific became interrupted, and that the Gulf Stream set in in the opposite direction. In the same number is a continuation of M. Berthelot's paper on isomeric states of simple substances, treating especially of sulphur.

SOCIETIES AND ACADEMIES

LONDON

London Mathematical Society, June 9.—Prof. Cayley President, in the chair. The Hon. Sir James Cockle was elected a member. Mr. Spottiswoode, V.P., having taken the chair, the president communicated the following "Note on the Cartesian, with two imaginary axial foci." Let A, A′, B, B′, be a pair of points and antipoints; viz., A, A′, the two imaginary points, co-ords $(\pm \beta i, 0)$; B, B′, the two real points, co-ords $(0, \pm \beta)$, and write $\rho, \rho', \sigma, \sigma'$, the distances of a point (x, y) from the four points respectively, say

$$\rho = \sqrt{(x + \beta i)^2 + y^2} \qquad \rho' = \sqrt{(x - \beta i)^2 + y^2}$$

$$\sigma = \sqrt{x^2 + (y + \beta)^2} \qquad \sigma' = \sqrt{x^2 + (y - \beta)^2}$$

we have

$$\rho^2 + \rho'^2 = 2(x^2 + y^2) - 2\beta^2 = \sigma^2 + \sigma'^2 - 4\beta^2$$

$$\rho\rho' = \sqrt{(x + \beta i + yi)(x + \beta i - yi)(x - \beta i + yi)(x - \beta i - yi)} = \sigma\sigma'$$

and thence

$$(\rho + \rho')^2 = (\sigma \times \sigma')^2 - 4\beta^2$$

$$(\rho - \rho')^2 = (\sigma - \sigma')^2 - 4\beta^2$$

or say

$$\rho + \rho' = \sqrt{(\sigma + \sigma')^2 - 4\beta^2}$$

$$i(\rho - \rho') = \sqrt{4\beta^2 - (\sigma - \sigma')^2}$$

The equation of a Cartesian having the two imaginary axial foci, A, A′, is

$$(p + qi)\rho + (p - qi)\rho' + 2k^2 = 0$$

viz., this is,

$$p(\rho + \rho') + qi(\rho - \rho') + 2k^2 = 0$$

or what is the same thing, it is

$$p\sqrt{(\sigma + \sigma')^2 - 4\beta^2} + q\sqrt{4\beta^2 - (\sigma - \sigma')^2} + 2k^2 = 0$$

which is the equation expressed in terms of the distances σ, σ', from the non-axial real foci, B, B′. The radicals are to be taken with the signs $\pm$. This equation gives, however, the Cartesian in combination with an equal curve situate symmetrically therewith in regard to the axis of y.

The distance σ, σ' may conveniently be expressed in terms of a single variable parameter θ; in fact, we may write

$$\pm p\sqrt{(\sigma + \sigma')^2 - 4\beta^2} = -k^2 - k\theta$$

$$\pm q\sqrt{4\beta^2 - (\sigma - \sigma')^2} = -k^2 + k\theta$$

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